

SUB  
C-57  
A6  
27. The composition of formula 17 shown in claim 22.

28. The composition of formula 17 shown in claim 23.

29. The composition of formula 25 shown in claim 24.

#### REMARKS

The Office Action rejection of claims 3 – 24 & 26 as indefinite under 35 U.S.C. 112, second paragraph, is respectfully traversed. The above claims have been amended to meet the concerns of the Office Action as indicated and this rejection is believed met.

As for claim 10 where it is said that there are no “small m” units in the POSS reaction of claim 3, see the recitation of “# = m+n” in such claim.

As for the objection of claim 11, that there is one less Si atom in the final product, this is because one  $R_3SiO_{1.5}$  unit is lost in the reaction according to Applicant.

However, claim 19 has not been amended because formulas 7 – 16 are believed implicit in the formula defined in claim 18 from which the latter claim depends. As the formulas 7 – 16 are already shown above claim 19, they are cited to avoid the repetition thereof.

Claim 26 has also not been amended because it is believed that formulas 17, 18 & 5 are implicit in the composition defined in claim 25 and as an extra, the above formulas are referenced as clear illustrations thereof without the need to re-illustrate same.

In addition, alternate claims 27, 28 & 29 have been added as an additional way to express the compositions of formulas 17, 18 & 5, as shown.

The Office Action rejection of claims 18 and 19 as anticipated under 35 U.S.C. 102 (b) by Lichtenhan et al '562 is respectfully traversed. Thus claim 18 as amended recites a POSS

compound having at least three open rings when OH substituents are present, as indicated, unlike the referenced compound.

The Office Action rejection of claims 20 – 26 as anticipated under 35 U.S.C. 102(b) by or in the alternative, under 35 U.S.C. 103(a) as obvious over Lichtenhan et al '562, is respectfully traversed. The '562 reference teaches a reaction in which a caged molecule goes to a polymer or linear chain product, whereas Applicants' products such as recited by claims 20-26, define as products, caged molecules that are monomers and distinct from linear chains.

It is noted that claims 1 and 2 are allowed and that claims 3 – 17 would be allowable if rewritten or amended to overcome the above 112 rejections. Hopefully, claims 3 – 17 have been so amended and the remaining claims likewise amended.

In view of the foregoing the claims of record ,as amended, are believed distinguished over the applied art and in condition for allowance. Early notice of allowance is requested.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner: Thomas C. Stover (781) 377-3779.

Respectfully submitted,



---

THOMAS C. STOVER  
Attorney for Applicant(s)

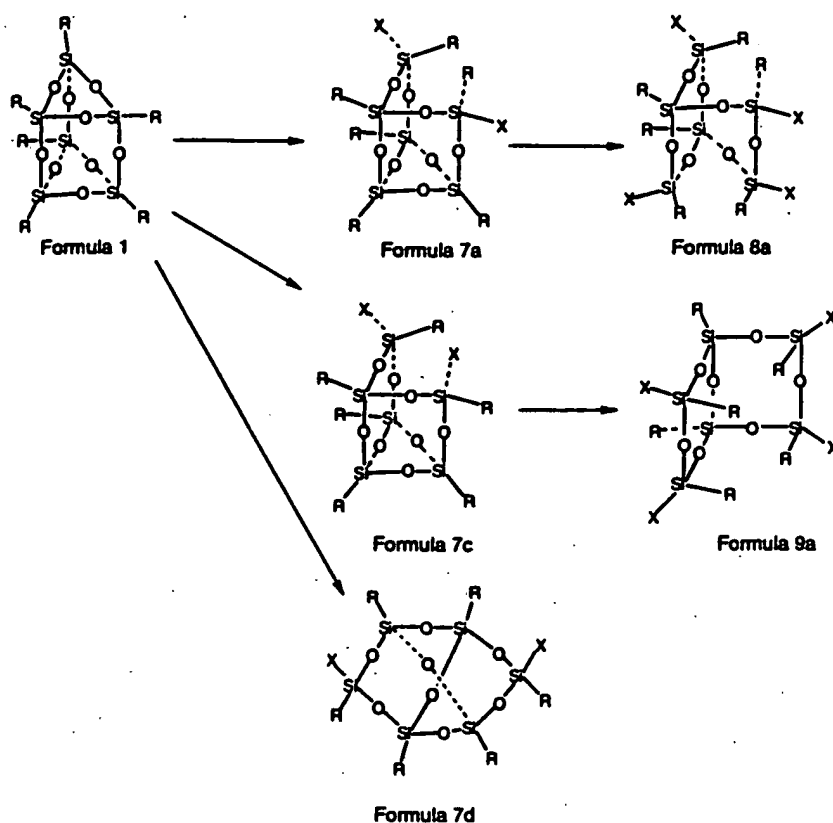
Marked-up version of claims to show changes made to above clean version.

Amend or rewrite the following claims.

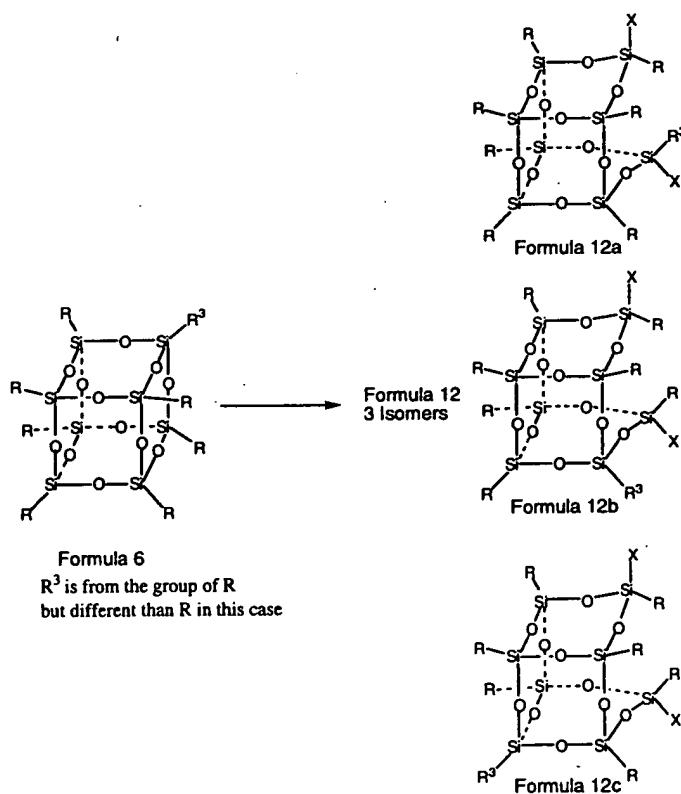
3. (Amended) A method for selectively opening the rings in POSS compounds to form functionalized POSS derivatives comprising, reacting  $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$  with a strong acid to form  $[(\text{RSiO}_{1.5})_{n-m}(\text{RXSiO}_{1.0})_m]_{\Sigma\#}$ , where n is 4-24, m is 1-10, # is m+n, R is selected from the group consisting of aliphatic, aromatic, olefinic, alkoxy, siloxy and H and X is the conjugate base of said acids, which base is F, OH, SH, NHR,  $\text{NR}_2$ ,  $\text{ClO}_4$ ,  $\text{SO}_3\text{CH}_3$ ,  $\text{SO}_3\text{CF}_3$ ,  $\text{SO}_3\text{OH}$ ,  $\text{SO}_3\text{Cl}$ ,  $\text{SO}_3\text{CH}_3$ ,  $\text{NO}_3$ ,  $\text{PO}_4$  or Cl.

5. (Amended) [The method of claim 3 wherein the POSS compound to be opened is  $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n(\text{R}^3\text{SiO}_{1.5})_m]_{\Sigma\#}$  or  $[(\text{RSiO}_{1.5})_n(\text{R}^1\text{R}^2\text{SiO}_{1.0})_m]_{\Sigma\#}$  where n is 6-12, where  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are different substituents selected from the group of aliphatic, aromatic, olefinic, alkoxy, siloxy or H and where # is the sum of the lettered substituents in said POSS compound.] A method for selectively opening the rings in POSS compounds to form functionalized POSS derivatives comprising, reacting  $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n(\text{R}^3\text{SiO}_{1.5})_m]_{\Sigma\#}$ , or  $[(\text{RSiO}_{1.5})_n(\text{R}^1\text{R}^2\text{SiO}_{1.0})_m]_{\Sigma\#}$  with a strong acid to form said derivatives, where n is 6-12, m is 1-10, where  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are different substituents than R, which are all selected from the group consisting of aliphatic, aromatic, olefinic, alkoxy, siloxy and H and where # is the sum of the lettered substituents in said POSS compound.

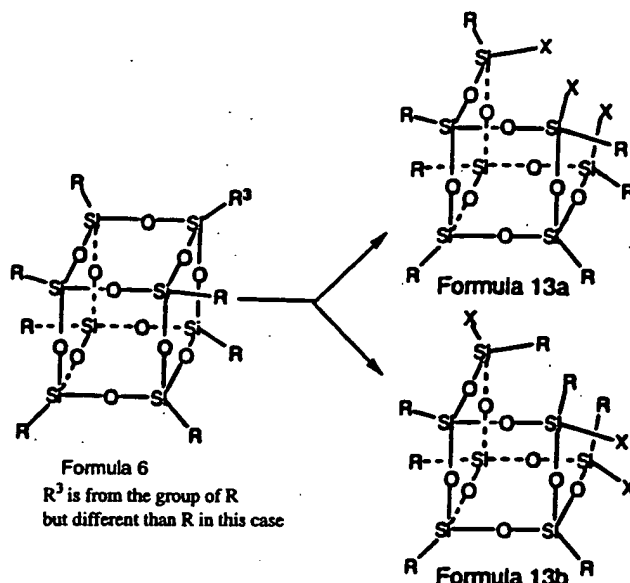
12. (Amended) The method of claim 3 wherein the compound of formula 1 is reacted with said acid to form a compound of [formula 7, 8, or 9 as follows] of the following formulas:



16 (Amended) The method of claim [3] 5 wherein the compound of formula 6 is reacted with said acid to form the compound selected from formulas 12a, b, or c as follows :



17. (Amended) The method of claim [3] 5 wherein the compound of formula 6 is reacted with said acid to form the compound selected from the group of formulas 13 a and b as follows:



18. (Amended) A polyhedral oligomeric silsesquioxane (POSS) compound [comprising] of the formula,  $[(\text{RSiO}_{1.5})_n (\text{RXSiO}_{1.0})_m]_{\Sigma\#}$ , where n is 4-24, m is 1-10, R is aliphatic, aromatic, olefinic, alkoxy, siloxy or H and X is the conjugate base of an acid, which base is of F, OH when said compound has at least three open rings, SH, NHR or  $\text{NR}_2$ ,  $\text{ClO}_4$ ,  $\text{SO}_3\text{OH}$ ,  $\text{SO}_3\text{CF}_3$ ,  $\text{SO}_3\text{Cl}$ ,  $\text{SO}_3\text{CH}_3$ ,  $\text{NO}_3$ , or  $\text{PO}_4$ .

20. (Amended) A method for expanding rings in polyhedral oligomeric silsesquioxane (POSS) compounds comprising, reacting  $[(\text{RSiO}_{1.5})_n (\text{R}(\text{HO})\text{SiO}_{1.0})_m]_{\Sigma\#}$  with  $\text{Y}_2\text{SiR}^1\text{R}^2$  silane reagents to obtain at least one expanded POSS ring in  $[(\text{RSiO}_{1.5})_{n+m} (\text{R}^1\text{R}^2\text{SiO}_{1.0})_j]_{\Sigma\#}$ , where R,  $\text{R}^1$  and  $\text{R}^2$  are aliphatic, aromatic, olefinic, alkoxy, siloxy or H, Y is halide or amine, n is 4-24, m is 1-2 and j is 1-10.